US009764875B2

(12) **United States Patent**
Stanek et al.

(10) **Patent No.: US 9,764,875 B2**
(45) **Date of Patent: *Sep. 19, 2017**

(54) **METHODS FOR PROTECTING A GROUND SURFACE FROM EXPOSURE TO MATERIAL THAT MAY BE SPILLED FROM OR LEAK FROM ONE OR MORE CONTAINERS**

(71) Applicant: **ENPAC, L.L.C.**, Eastlake, OH (US)

(72) Inventors: **Lawrence Stanek**, Akron, OH (US); **Jay Wiley**, Mentor, OH (US); **Robert Heintz**, Chardon, OH (US); **Scott Janda**, Chagrin Falls, OH (US); **Timothy Reed**, Northfield Center, OH (US)

(73) Assignee: **ENPAC, L.L.C.**, Eastlake, OH (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 132 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **14/856,821**

(22) Filed: **Sep. 17, 2015**

(65) **Prior Publication Data**

US 2016/0001920 A1 Jan. 7, 2016

Related U.S. Application Data

(63) Continuation of application No. 14/380,357, filed as application No. PCT/US2013/027026 on Feb. 21, 2013, now Pat. No. 9,150,350.
(Continued)

(51) **Int. Cl.**
B65D 19/44 (2006.01)
B65D 19/06 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***B65D 19/06*** (2013.01); ***B65D 90/24*** (2013.01); ***F16N 31/006*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC B65D 19/44; B65D 90/24; B65D 15/24; B65D 37/00; B65D 33/02; F16N 31/00; F16N 31/006
(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,182,386 A * 1/1980 Alack B65G 69/182 108/55.1
4,206,846 A * 6/1980 Connolly B65B 11/045 108/55.1
(Continued)

FOREIGN PATENT DOCUMENTS

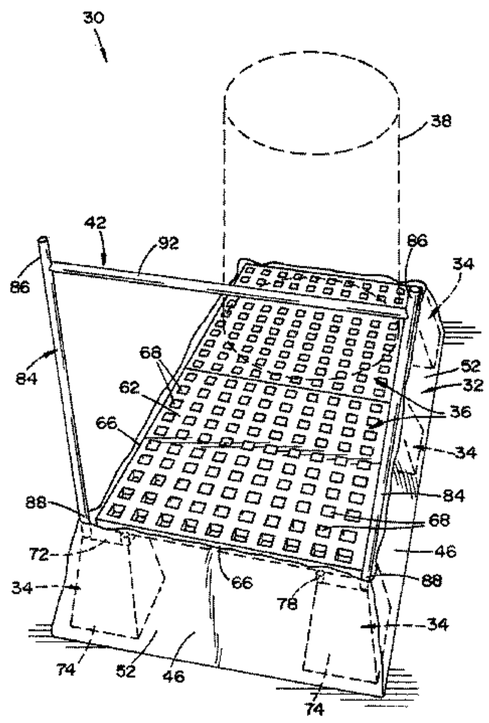
EP 303264 A2 2/1980
WO 2006/011814 A1 2/2006

Primary Examiner — Jose V Chen
(74) *Attorney, Agent, or Firm* — Rankin, Hill & Clark LLP

(57) **ABSTRACT**

Methods for protecting a ground surface from exposure to material that may be spilled from or leak from one or more containers, which includes setting up a portable spill containment system that includes at least one grate for supporting the one or more containers. The grate includes a plurality of drain holes. The portable spill containment system includes a flexible bag configured to contain spills or leakage from the one or more containers that pass through the drain holes of the grate. In one embodiment, the portable spill containment system includes a plurality of pedestals that support the at least one grate. In another embodiment, the portable spill containment system includes an interconnected grid structure formed of separate and distinct spaced apart beams.

10 Claims, 15 Drawing Sheets



Related U.S. Application Data

(60) Provisional application No. 61/601,246, filed on Feb. 21, 2012.

(51) **Int. Cl.**
B65D 90/24 (2006.01)
F16N 31/00 (2006.01)

(52) **U.S. Cl.**
CPC *B65D 2519/0086* (2013.01); *B65D 2519/00308* (2013.01); *B65D 2519/00358* (2013.01); *B65D 2519/00442* (2013.01); *B65D 2519/00985* (2013.01)

(58) **Field of Classification Search**
USPC 108/55.1, 55.3, 55.5; 220/571.1, 571, 220/9.4, 9.1
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,263,855	A *	4/1981	Lawlor	B65D 19/004	108/53.3
4,838,178	A *	6/1989	Chriske	B65D 19/0026	108/55.1
5,020,667	A *	6/1991	Bush	B65D 19/0018	108/55.1
5,036,976	A *	8/1991	Sechler	B65D 19/004	108/53.1
5,042,396	A *	8/1991	Shuert	B65D 19/0012	108/57.25
5,052,569	A	10/1991	Cooper		
5,249,699	A *	10/1993	Williams	B65D 19/0063	108/55.1
5,254,798	A	10/1993	Zoback		
5,359,955	A	11/1994	Grebenyuk		
5,429,236	A *	7/1995	Evans	B65D 19/0016	108/55.1
D370,765	S *	6/1996	Heintz	D34/38	
5,562,047	A *	10/1996	Forney	B65D 19/0002	108/24
5,579,700	A *	12/1996	Nuechterlein	B65D 19/0002	108/54.1
5,588,373	A *	12/1996	Bacskay	B65D 19/38	108/55.3
5,857,416	A *	1/1999	Donnell, Jr.	B65D 19/004	108/55.3
6,349,656	B1 *	2/2002	Mitchell	B65D 19/0087	108/53.1
6,382,108	B1	5/2002	Stanek et al.		
6,602,032	B2 *	8/2003	Arai	B65D 19/385	108/55.1
6,622,879	B1 *	9/2003	Carter	B65D 90/24	220/23.4
7,036,676	B2	5/2006	Christensen		
7,234,608	B2	6/2007	Reed et al.		
7,621,422	B2	11/2009	Reed et al.		
7,958,995	B2	6/2011	Dedmon et al.		
8,863,671	B2 *	10/2014	Shaw	B65D 19/40	108/25
9,150,350	B2 *	10/2015	Stanek	B65D 90/24	
2004/0261329	A1	12/2004	Kugler et al.		

* cited by examiner

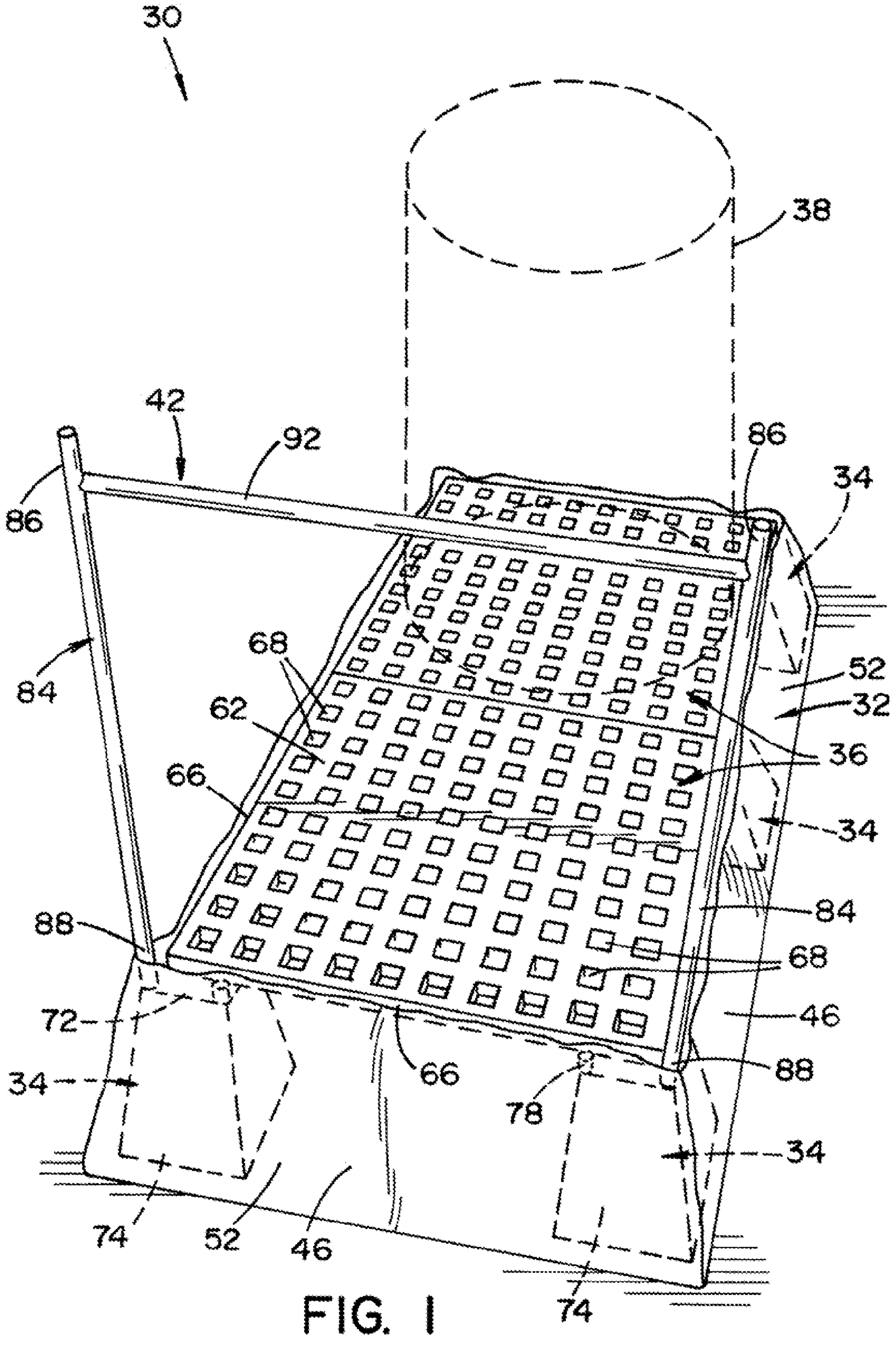

30
38
42
92
86
86
34
84
68
62
66
52
32
36
34
84
68
46
88
72
34
66
78
34
74
52
46
74

FIG. 1

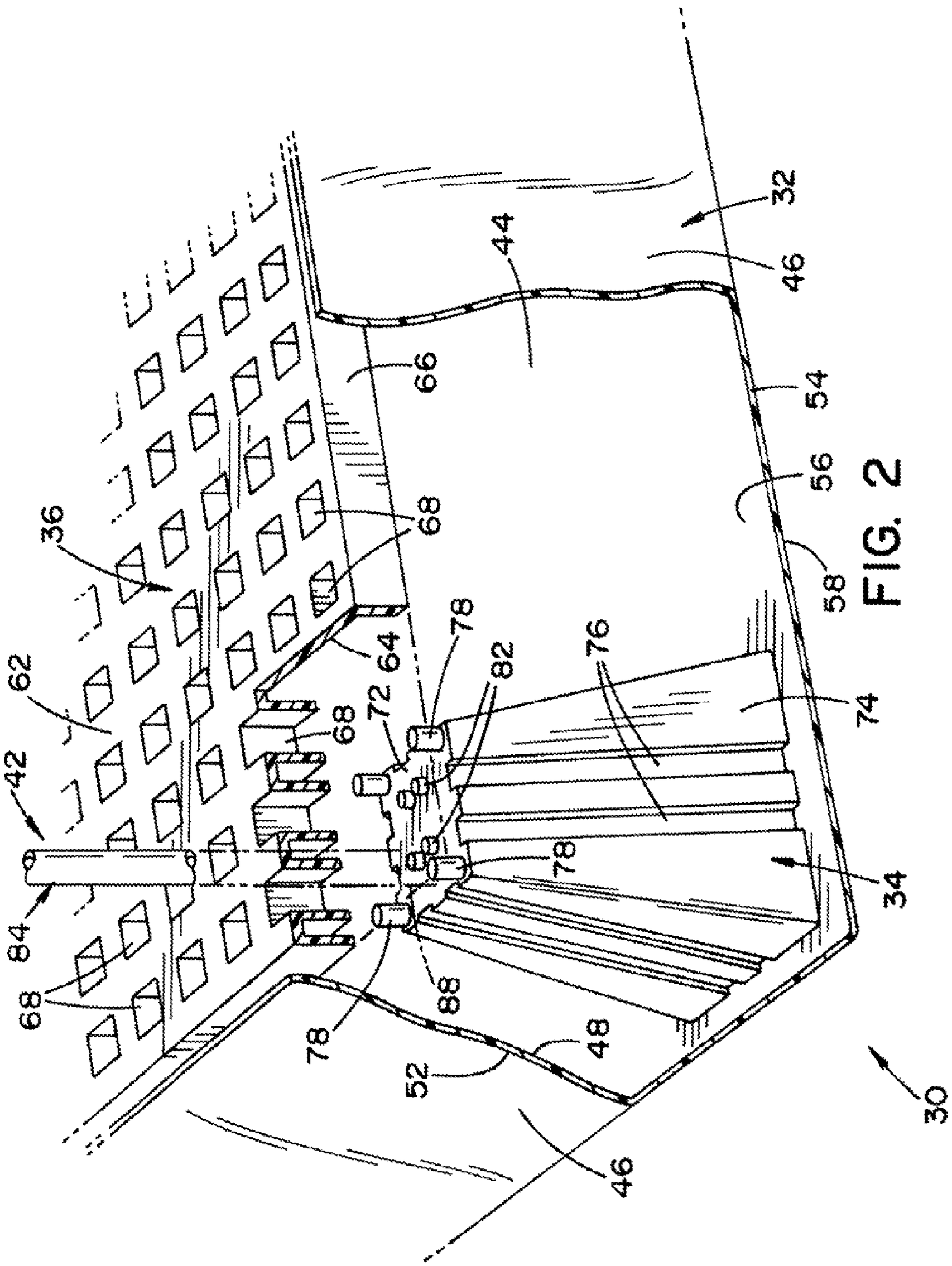

32
44
46
66
54
56
58
36
68
62
64
78
82
76
74
72
68
42
84
68
78
88
48
52
46
34
30

FIG. 2

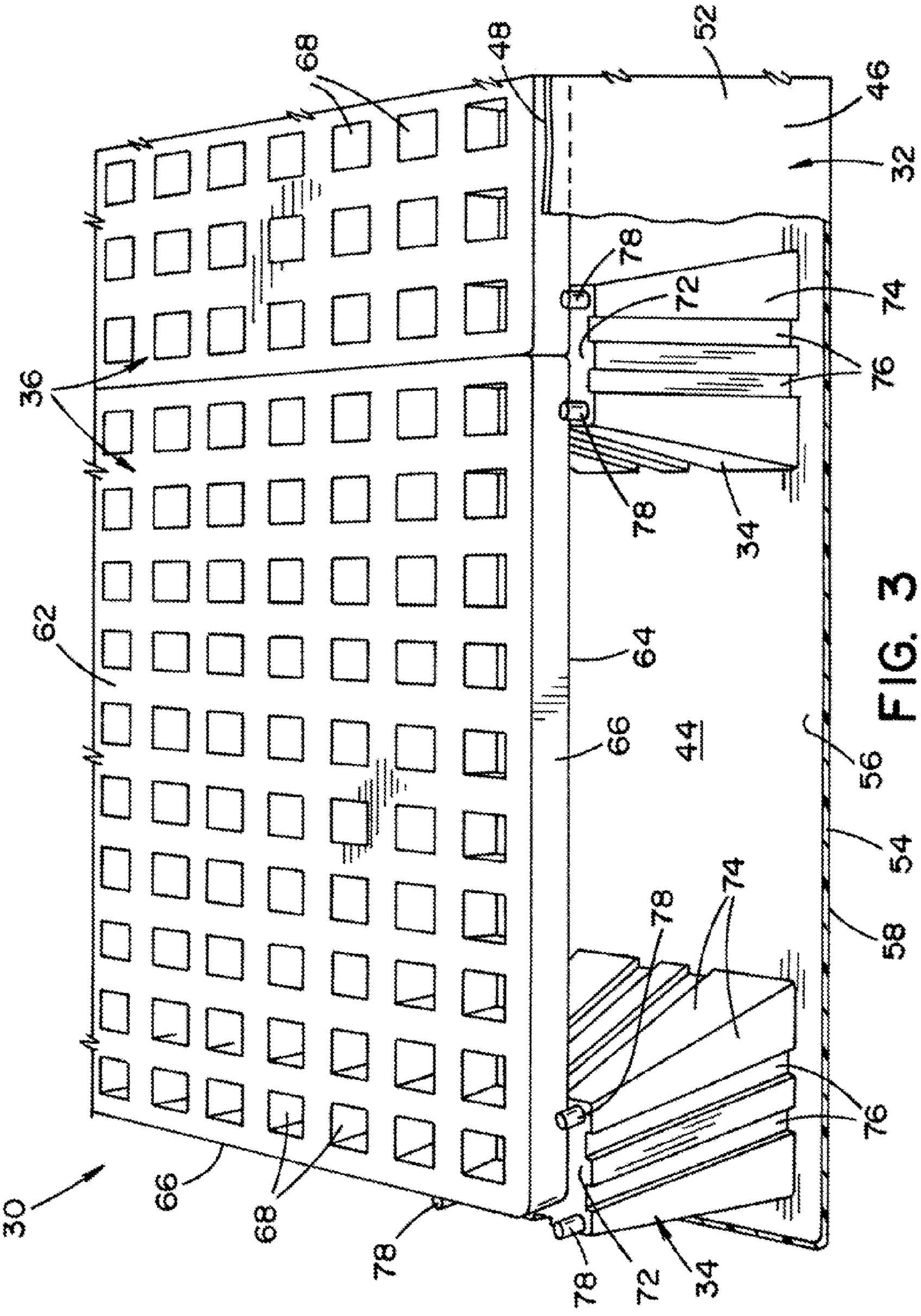

68
48
52
46
32
78
72
74
76
36
62
64
66
44
56
54
74
78
58
79
30
66
68
78
78
72
34

FIG. 3

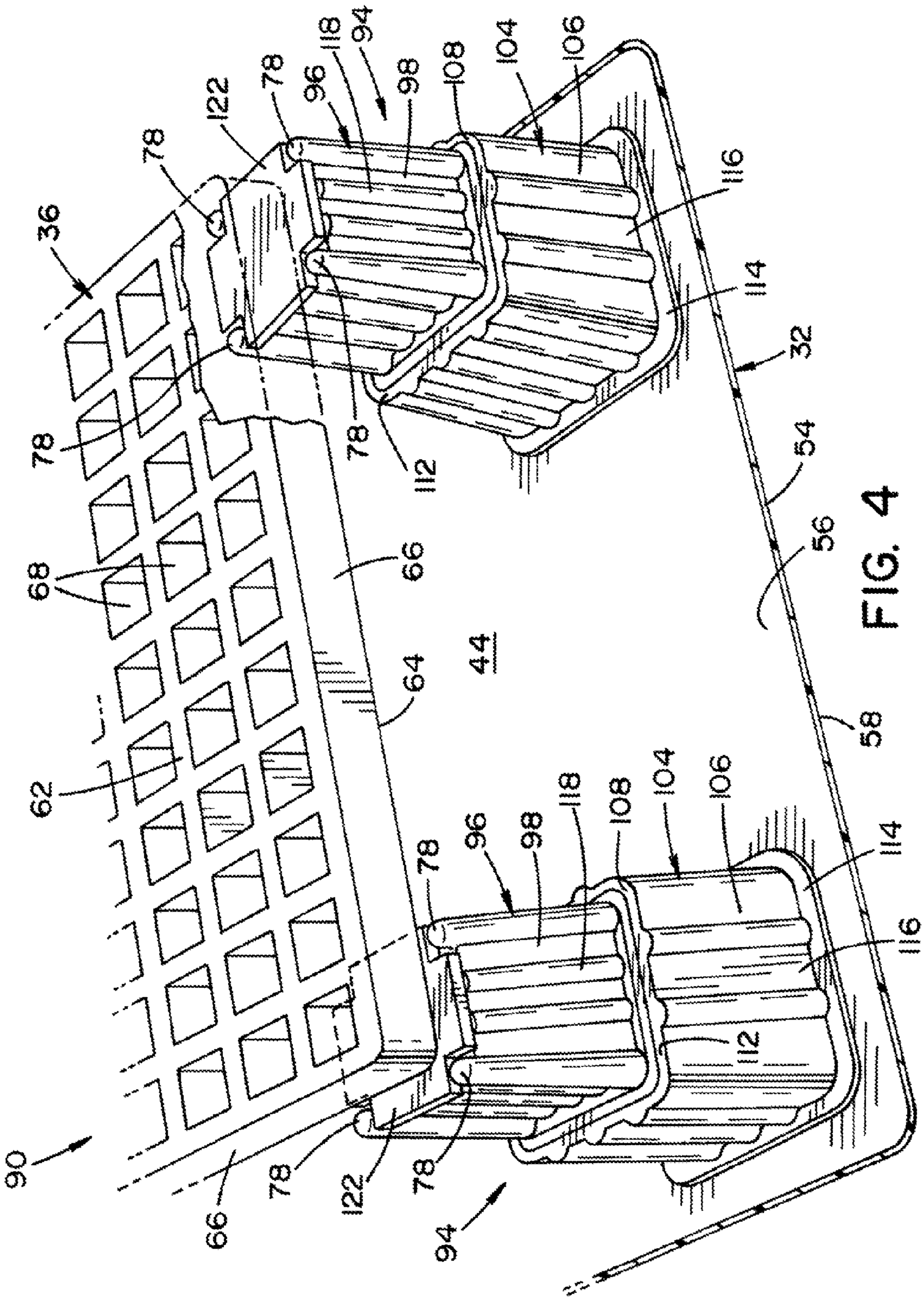

36
78
122
78
96
118
94
98
108
104
106
116
114
32
54
56
58
78
112
68
66
64
44
62
78
96
98
118
108
104
106
114
116
112
60
66
78
122
78
94

FIG. 4

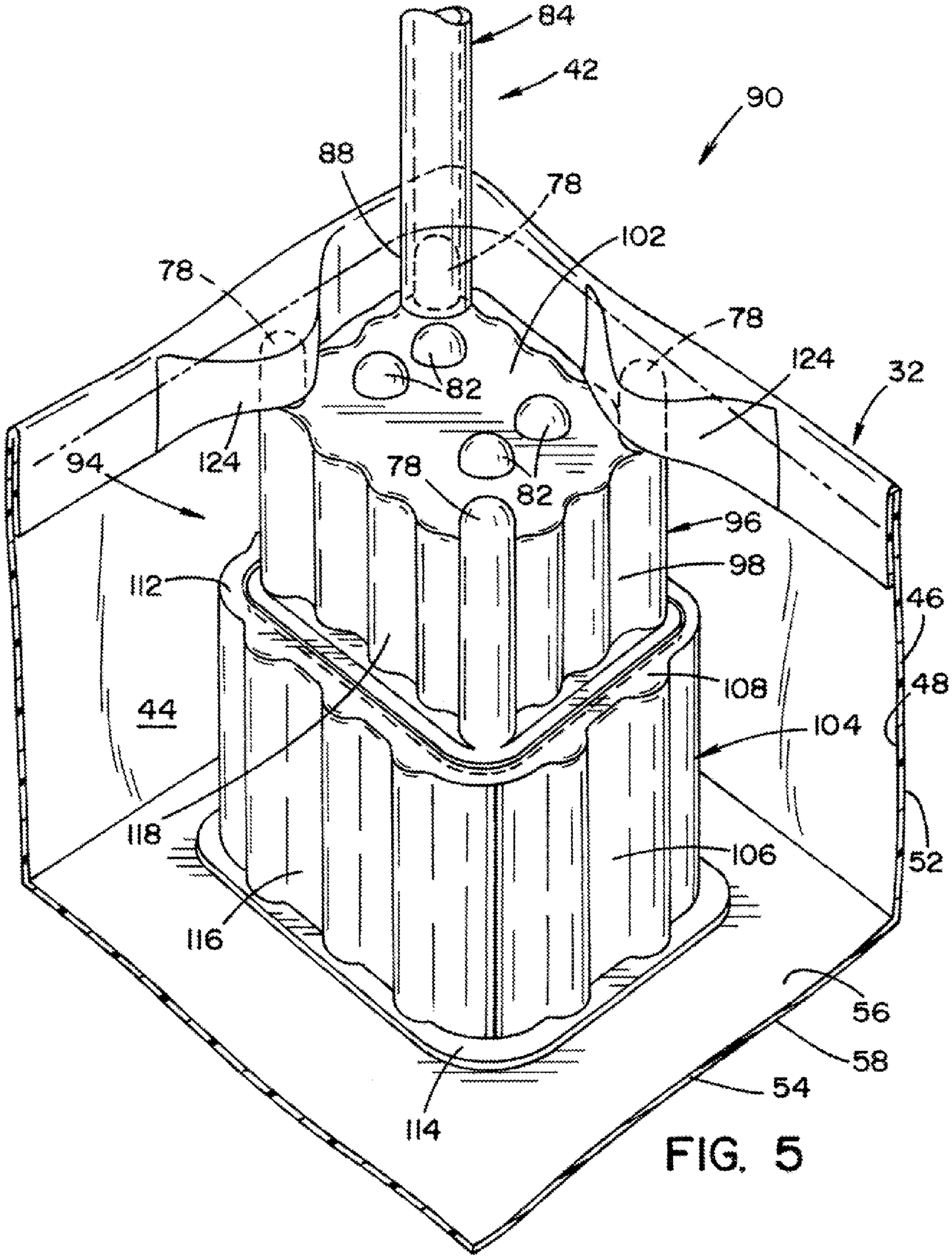

84
42
90
88
78
102
78
78
124
32
82
94
124
78
82
96
98
112
46
108
48
44
104
118
106
52
116
56
58
54
114

FIG. 5

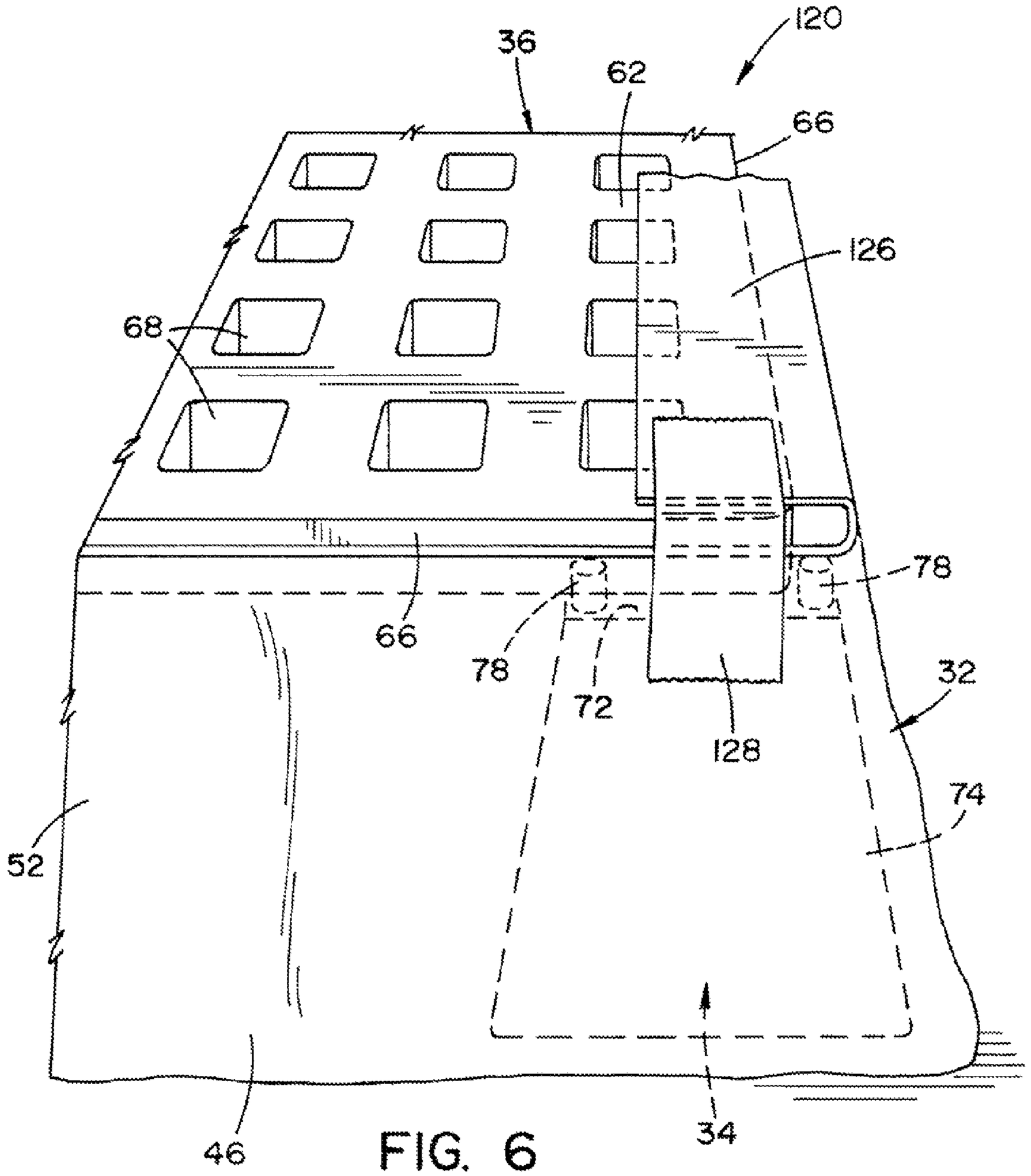


FIG. 6

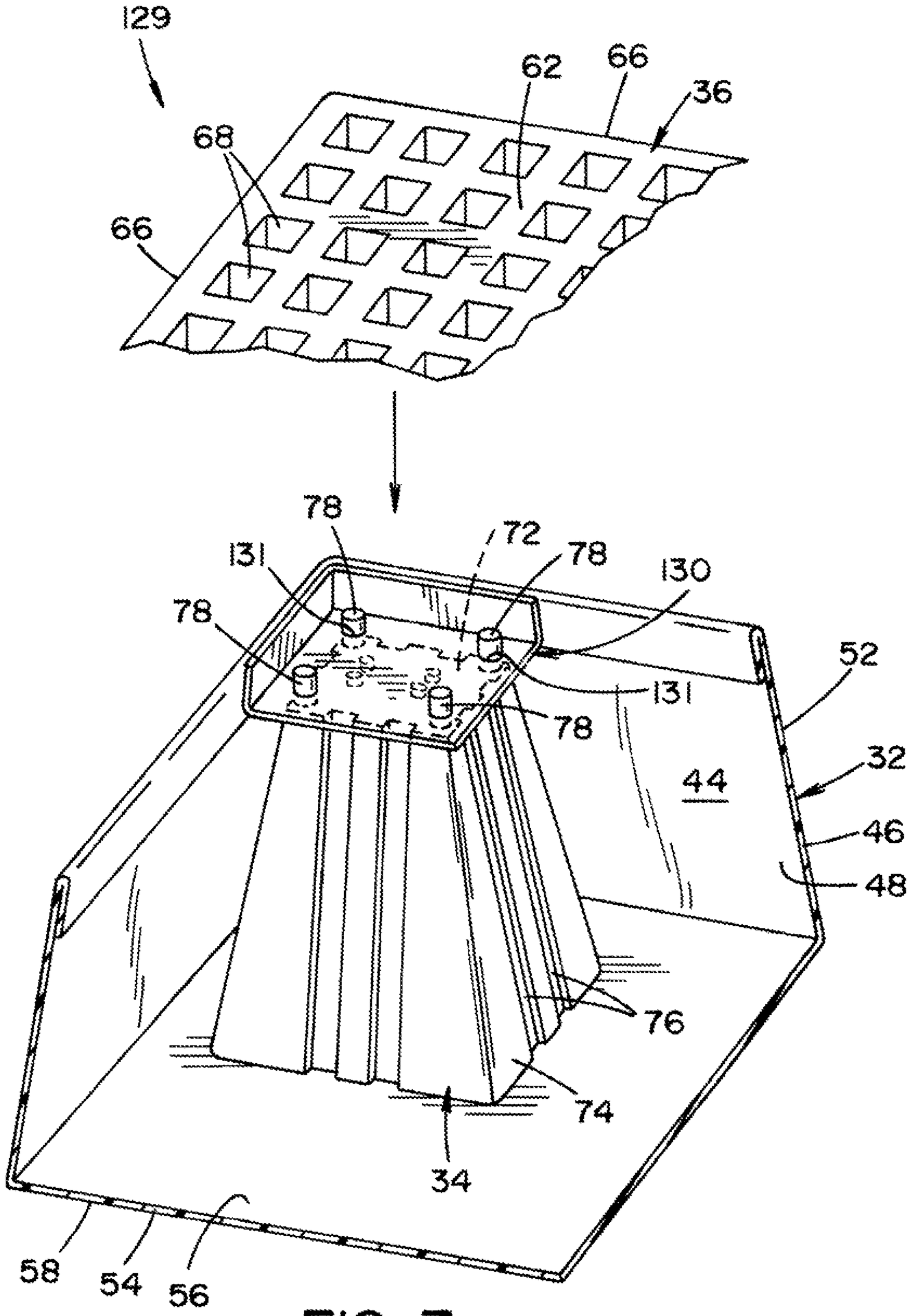

129
62
66
36
68
66
78
72
78
131
130
78
131
78
52
32
44
46
48
76
74
34
58
54
56

FIG. 7

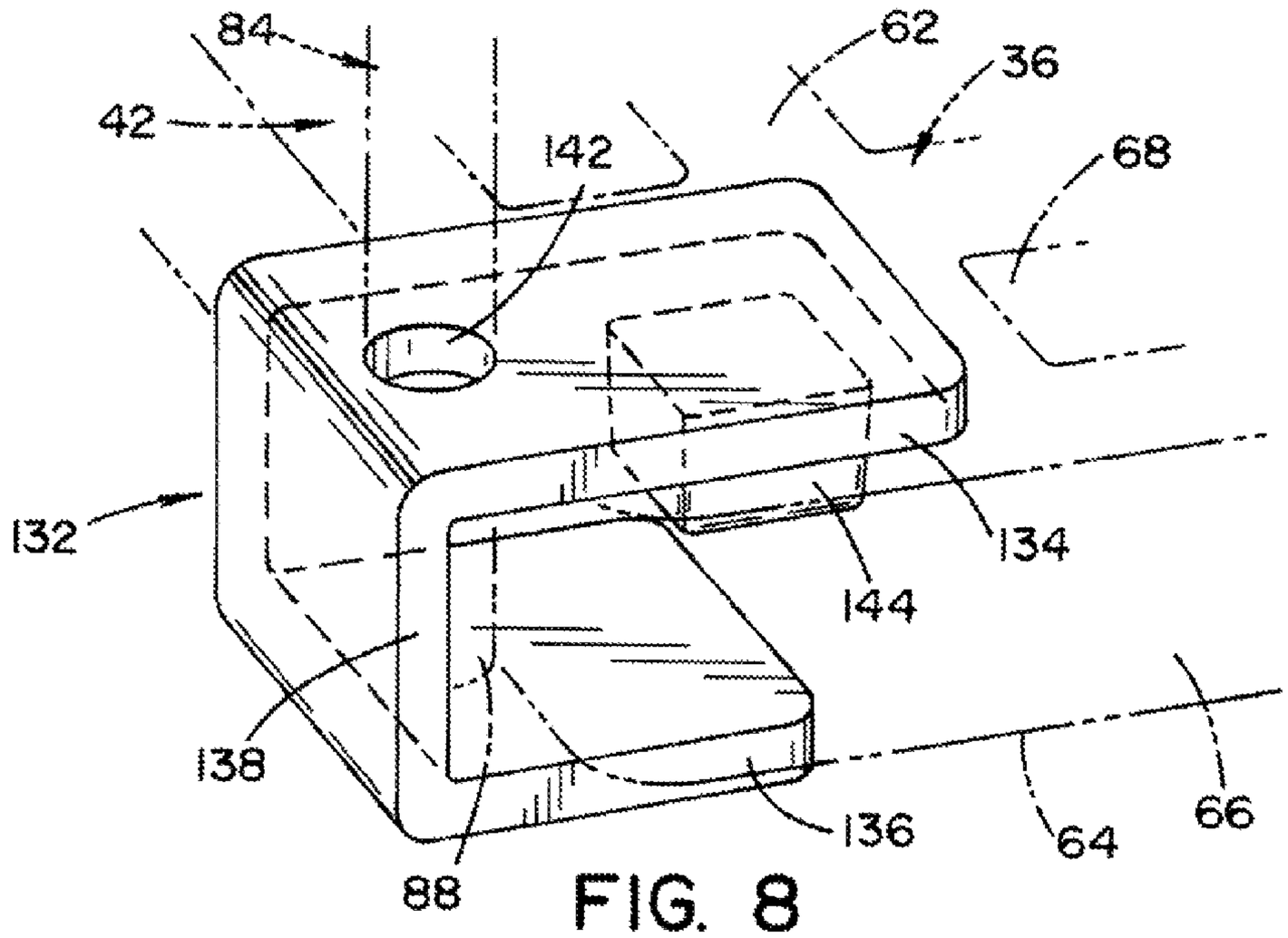


FIG. 8

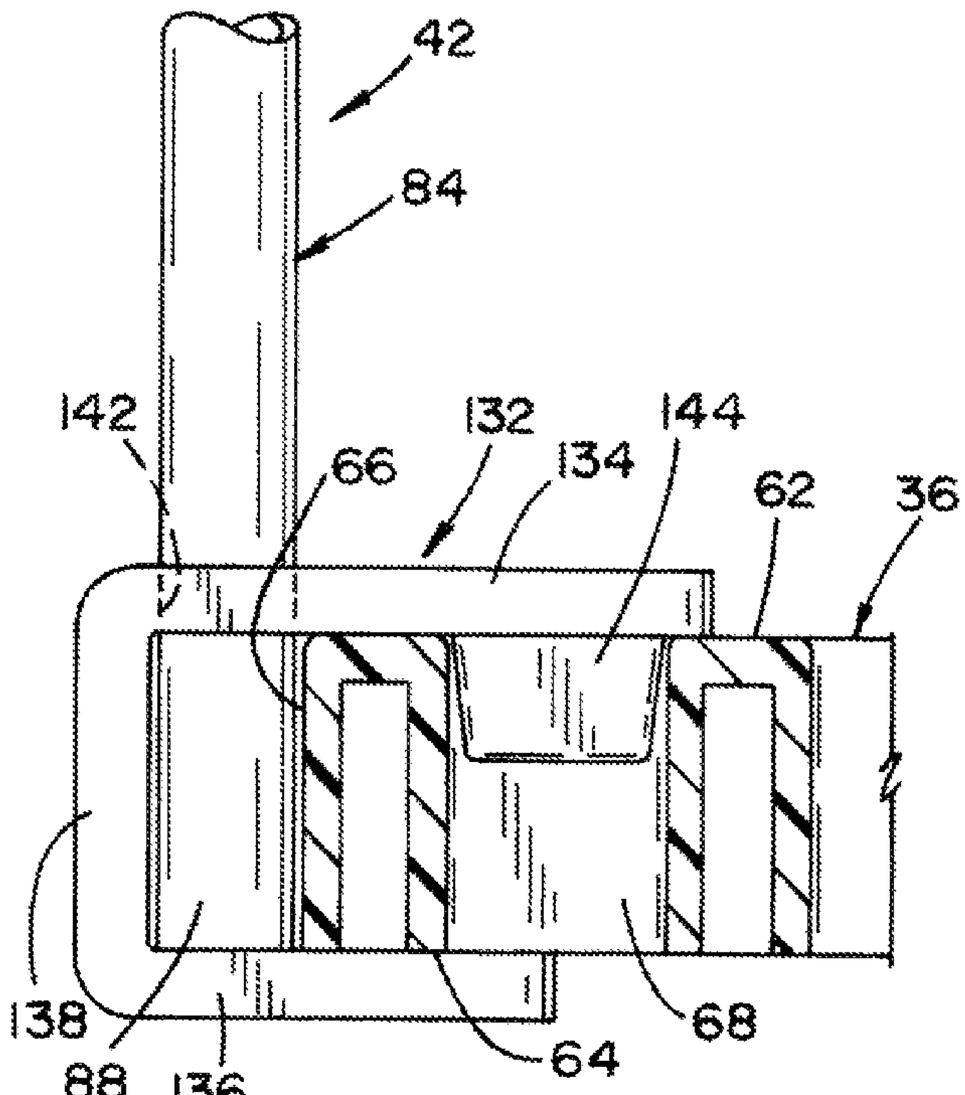


FIG. 9

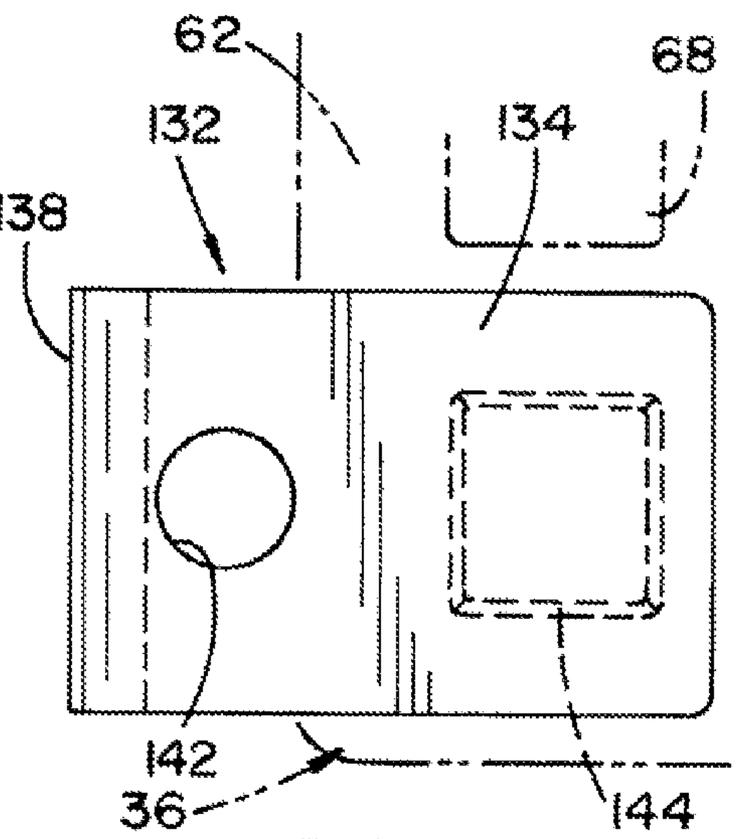


FIG. 10

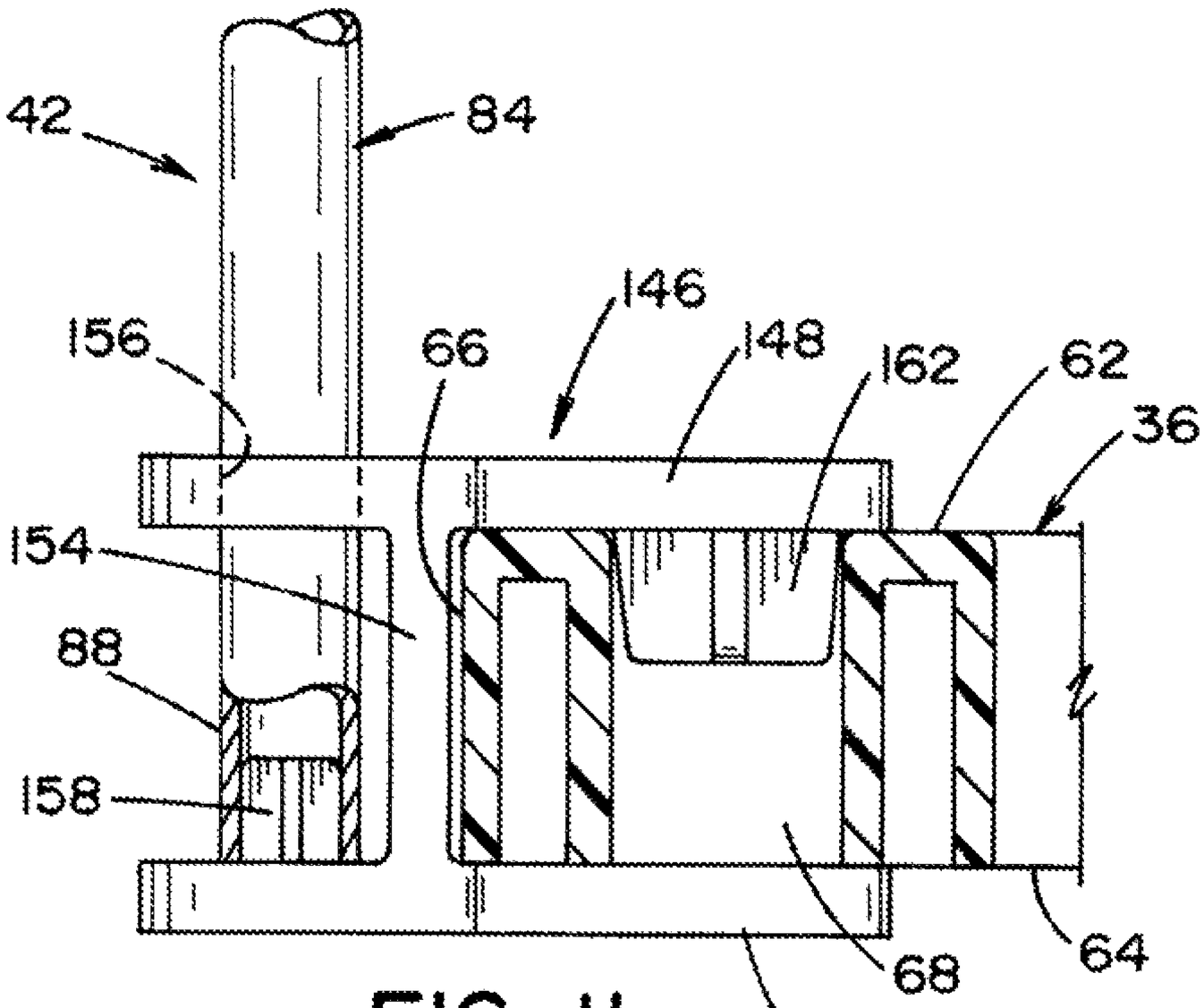

42
84
146
156
66
148
162
62
36
154
88
158
68
64
152

FIG. 11

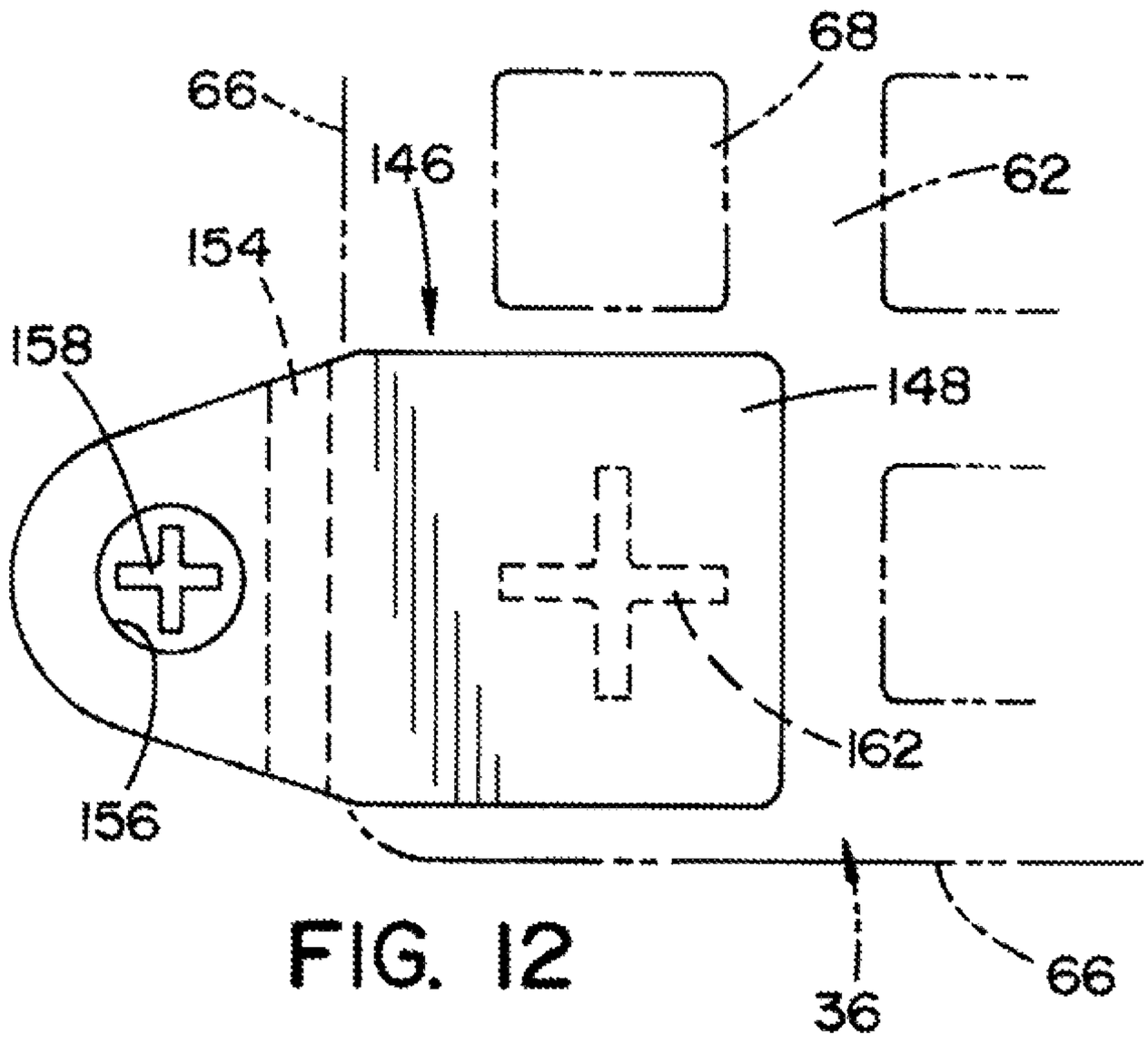

68
66
146
62
154
158
148
162
156
36
66

FIG. 12

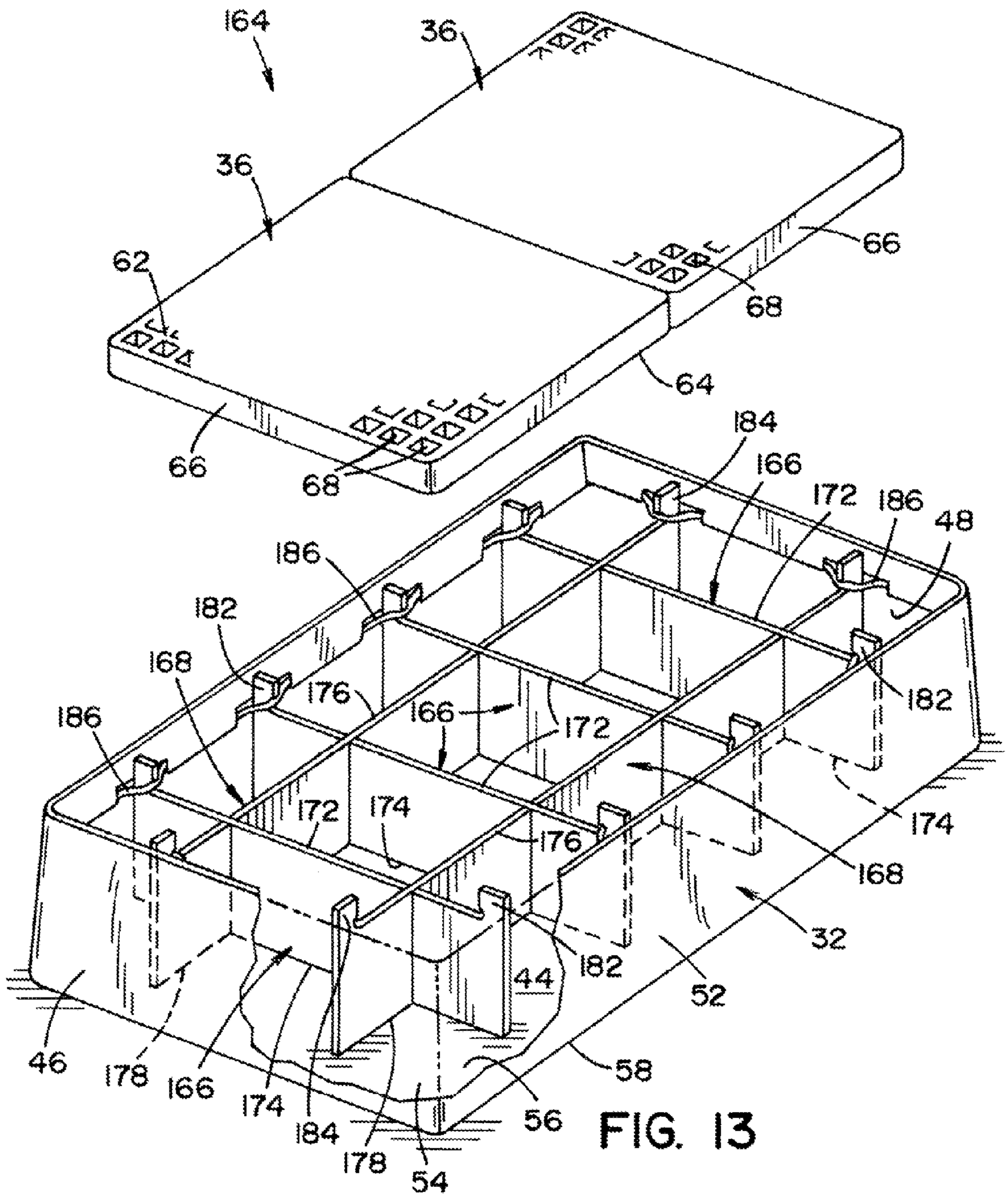

164
36
36
62
66
68
64
66
68
184
166
172
186
48
186
182
168
176
166
172
186
172
174
176
168
174
182
32
44
52
46
178
166
174
184
178
54
56
58

FIG. 13

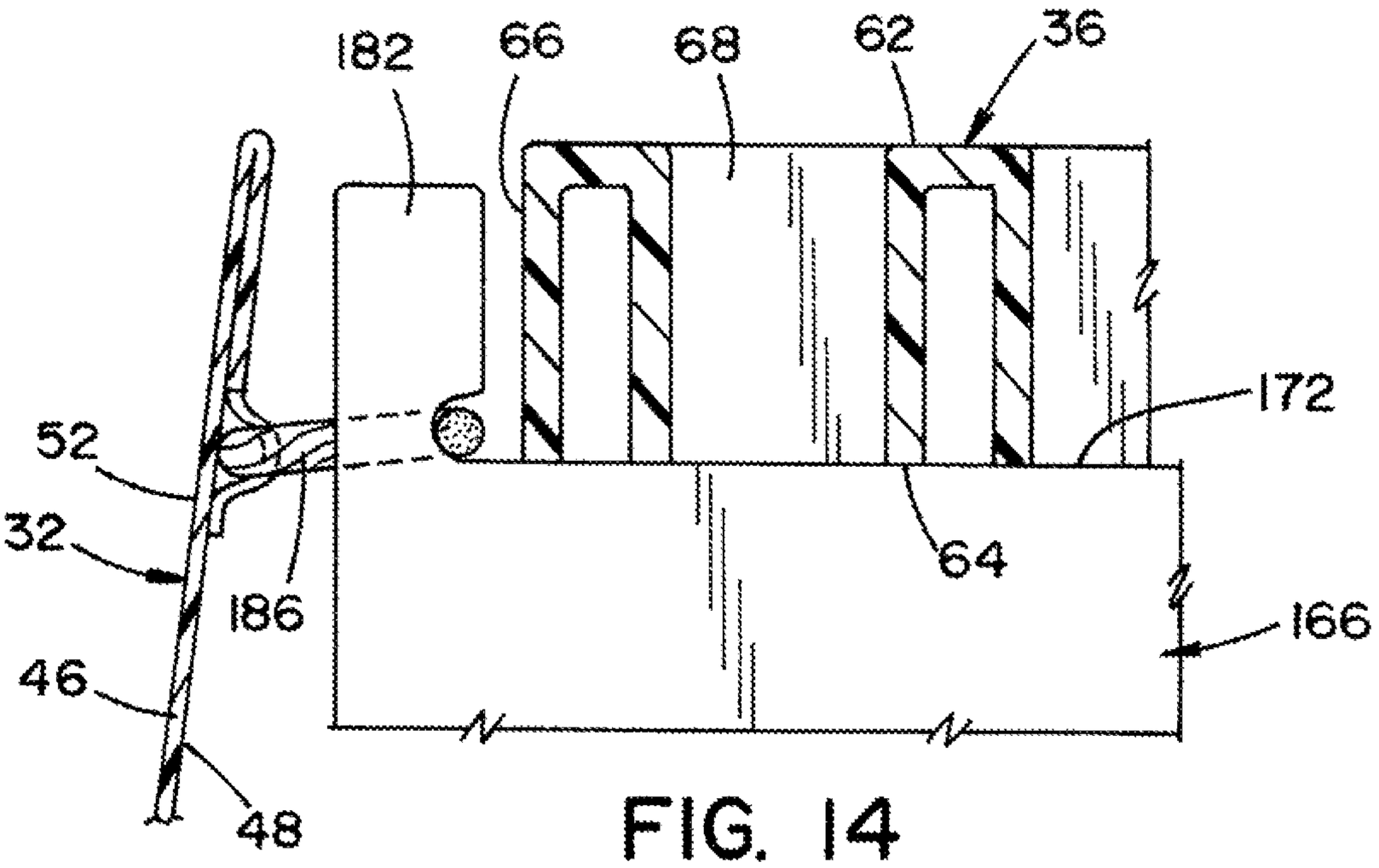

182
66
68
62
36
172
52
32
186
64
166
46
48

FIG. 14

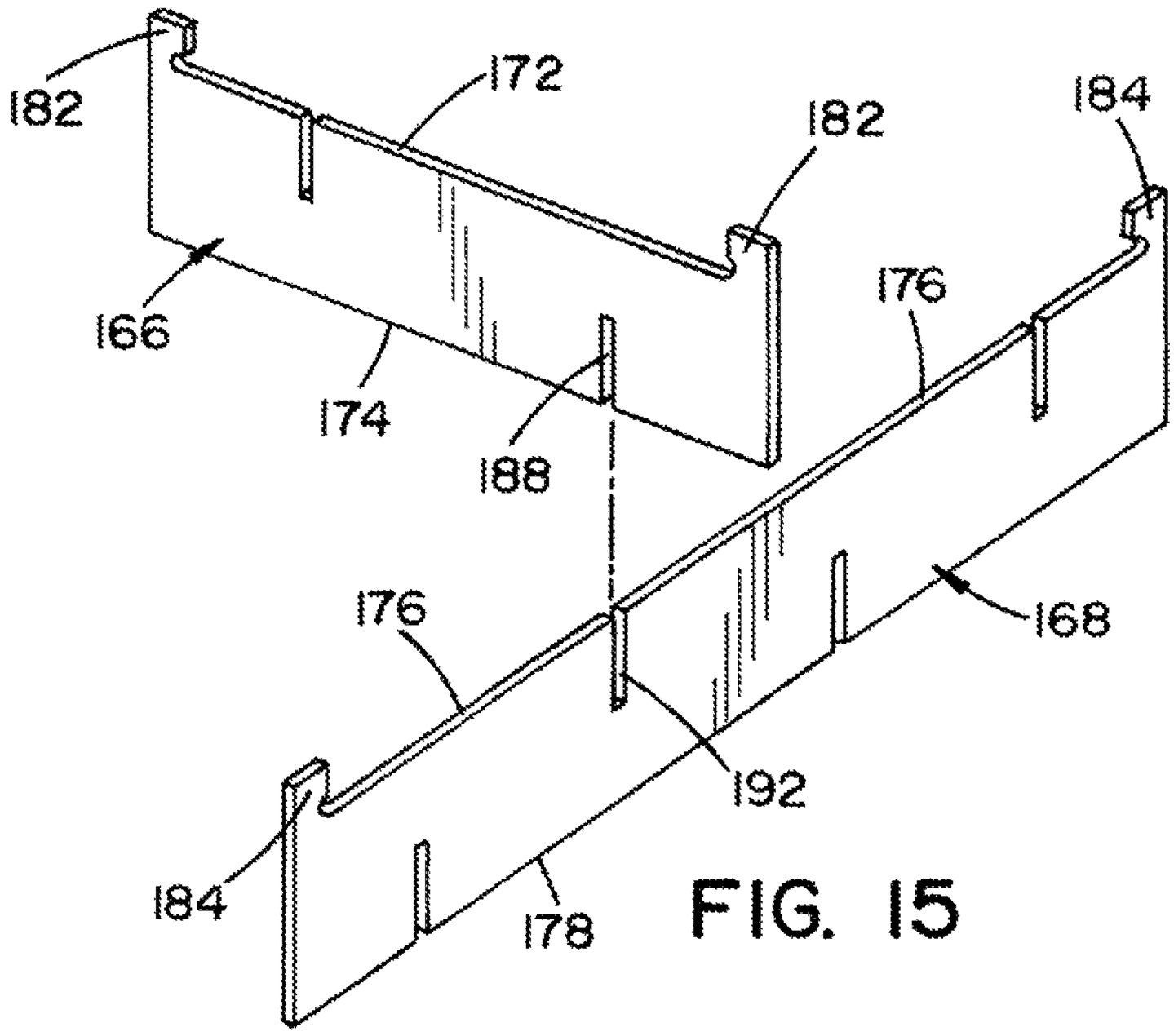

182
172
182
184
166
174
188
176
176
168
192
184
178

FIG. 15

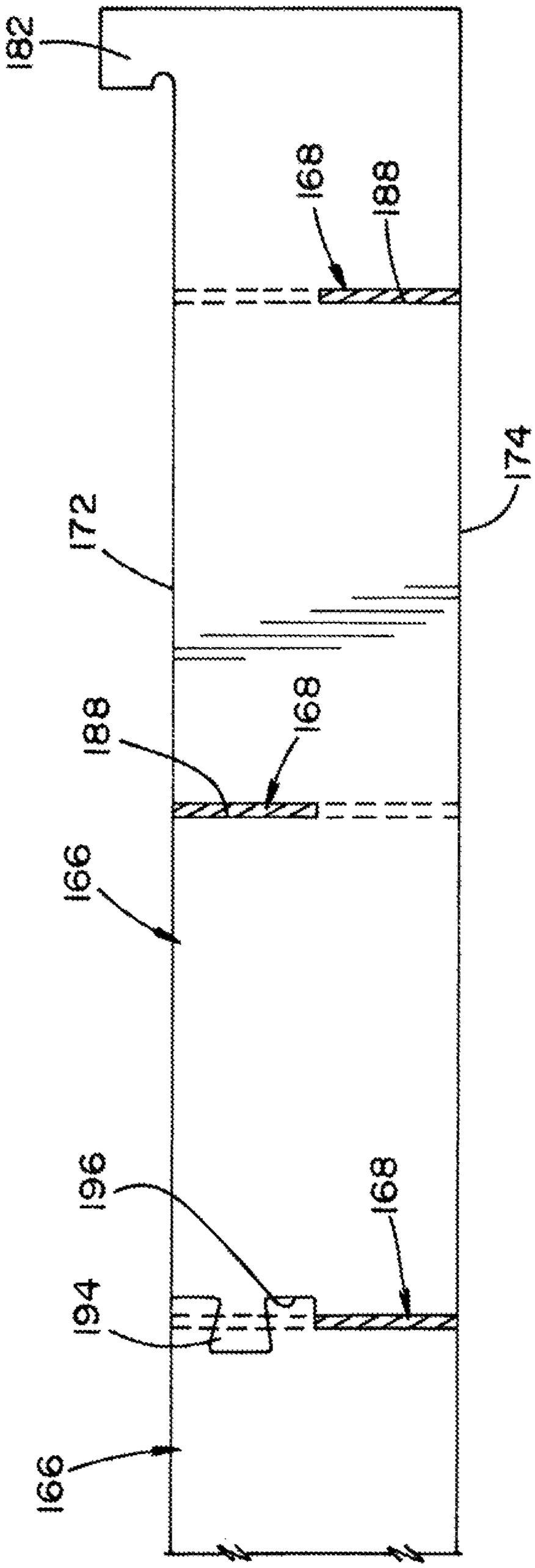


FIG. 16

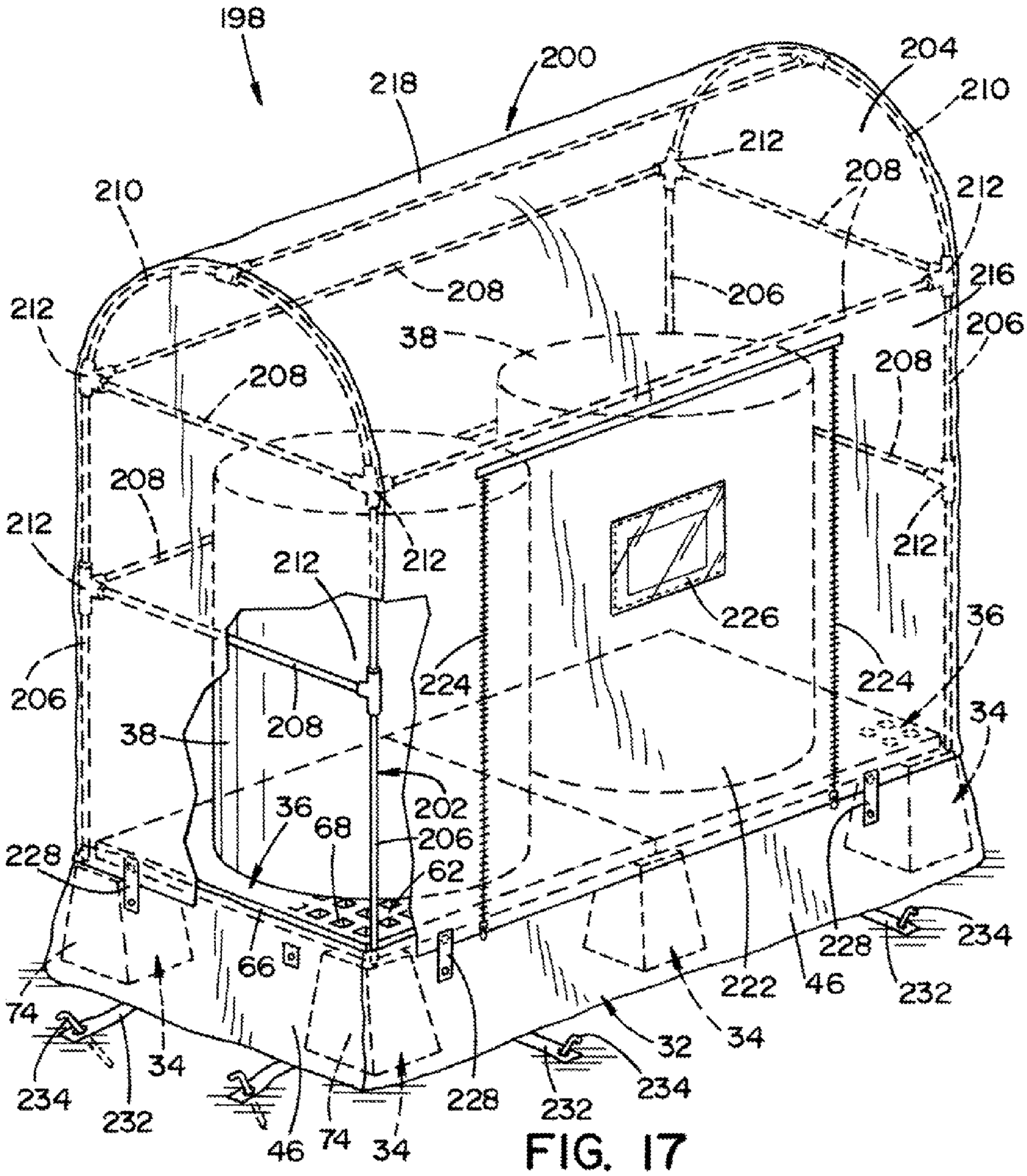

198
200
218
204
210
212
208
216
206
38
36
68
202
62
66
74
34
228
232
234
46
222
224
226
32

FIG. 17

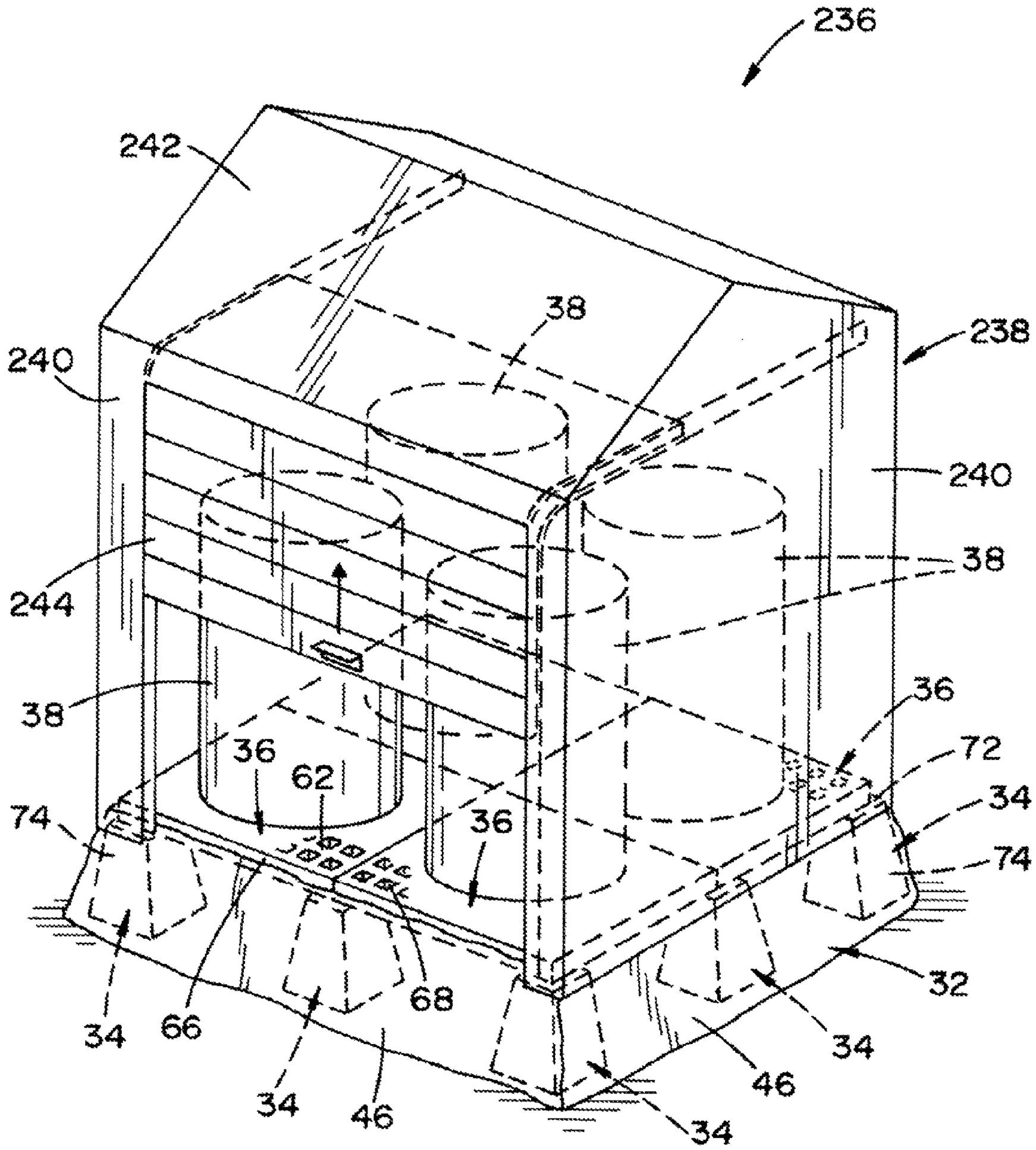

236
242
38
240
238
240
244
38
38
36
72
36
62
34
74
36
74
68
32
34
66
34
46
34
46
34

FIG. 18

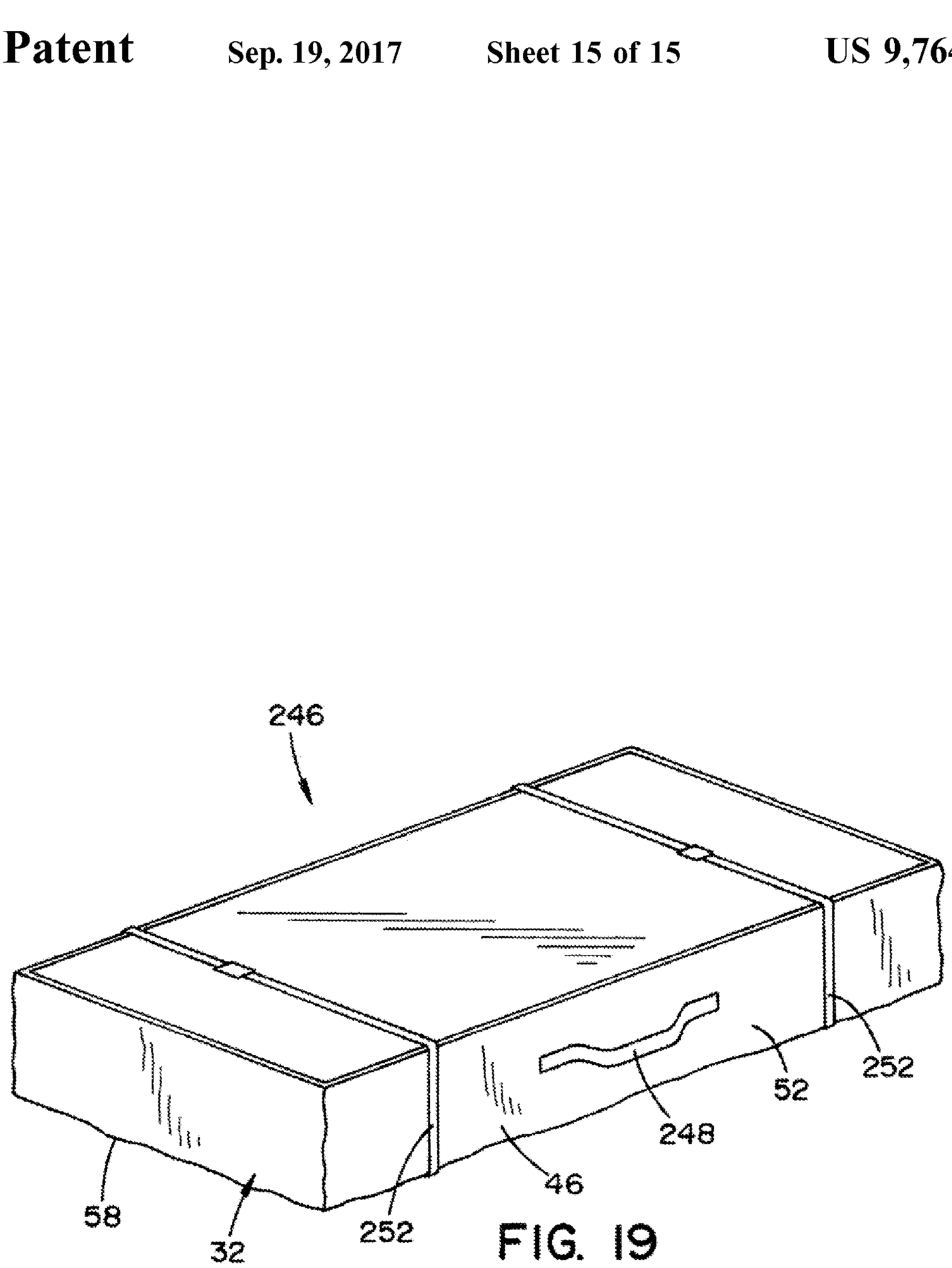


FIG. 19

METHODS FOR PROTECTING A GROUND SURFACE FROM EXPOSURE TO MATERIAL THAT MAY BE SPILLED FROM OR LEAK FROM ONE OR MORE CONTAINERS

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. patent application Ser. No. 14/380,357, filed Aug. 21, 2014, now U.S. Pat. No. 9,150,350 B2, which is a U.S. National Stage of PCT/US2013/027026, filed Feb. 21, 2013, and claims priority to U.S. Provisional App. Ser. No. 61/601,246, filed Feb. 21, 2012.

BACKGROUND OF THE INVENTION

Field of Invention

The present invention relates to portable spill containment systems.

Description of Related Art

Drums or containers are commonly used to store solids or fluids. These drums or containers can sometimes leak or spill their contents during storage or use. It is desirable to contain such spilled or leaked contents to reduce the risk of damage or injury that such contents could cause.

Spill containment assemblies such as disclosed in U.S. Pat. Nos. 7,234,608 and 7,621,422, both of which are owned by the assignee of the present application, can be used to support drums or containers on grates above a flexible containment bag. Such filled containment assemblies more than adequately meet the requirements for basic spill containment. However, additional improvements and features are disclosed herein.

BRIEF SUMMARY OF THE INVENTION

According to one aspect, a portable spill containment system according to the invention includes at least one grate that supports a container. The grate defines a plurality of drain holes. The spill containment system also includes a flexible bag that contains leakage from the container that passes through the drain holes of the grate. The portable spill containment system also includes a plurality of pedestals that support the at least one grate. The pedestals each include a top wall with a primarily planer face that faces the grate. The pedestals each include a plurality of primary projections that extend from the planer face of the top wall toward the grate.

According to another aspect, a portable spill containment system includes at least one grate that supports a container. The grate defines a plurality of drain holes. The portable spill containment system also includes a flexible bag that defines an interior to contain leakage from the container that passes through the drain holes of the grate. The flexible bag includes a bag bottom and a bag sidewall. The bag bottom and the bag sidewall each include an interior surface that faces the grate and an exterior surface that is opposite the respective interior surface. The portable spill containment system also includes a plurality of first beams that are spaced from and oriented parallel to one another. The first beams each include a first beam top surfaces that faces the grate and a first beam bottom surface that is opposite the first beam top surface. The portable spill containment system also includes a plurality of second beams being spaced from one another and crossing the plurality of first beams. The second beams each include a second beam top surface that faces the grate and a second beam bottom surface that is opposite the second beam top surface. The first beams and the second beams are disposed within the flexible bag so that at least one of the first beam top surfaces and the second beam top surfaces contacts the grate and at least of the first beam surfaces and the second beam bottom surfaces contacts the interior surface of the bag bottom of the flexible bag.

According to another aspect, a portable spill containment system includes at least one grate that supports a container. The grate defines a plurality of drain holes. The portable spill containment system also includes a plurality of pedestals that support the at least one grate. The pedestals each include a top wall with a primarily planer face that faces the grate. The pedestals each include a plurality of primary projections that extend from the planer face of the top wall toward the grate. The portable spill containment system also includes a flexible bag that receives the plurality of pedestals and contains leakage from the container that passes through the drain holes of the grate. The flexible bag includes an interior surface that faces the plurality of pedestals and an exterior surface that is opposite the interior surface. The portable spill containment system also includes a carry handle that is attached to the exterior surface of the flexible bag at a plurality of locations so as to define a loop.

According to another aspect, a portable spill containment system includes at least one grate that supports a container. The grate defines a plurality of drain holes. The portable spill containment system also includes a flexible bag that contains leakage from the container that passes through the drain holes of the grate. The portable spill containment system also includes a plurality of pedestals that support the at least one grate. The pedestals each include a top wall with a primarily planar face that faces the grate. The planar face includes at least one indentation. The grate includes at least one projection that downwardly extends toward the plurality of pedestals so as to be received by the at least one indentation.

The foregoing and other features of the invention are hereinafter more fully described and particularly pointed out in the claims, the following description setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principles of the present invention may be employed.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a portable spill containment system.

FIG. **2** is a partial perspective view of FIG. **1** with a portion of a grate removed.

FIG. **3** is a partial perspective view of FIG. **1** with a portion of a flexible bag removed.

FIG. **4** is a partial perspective view of an alternative portable spill containment system.

FIG. **5** is a partial perspective view of composite pedestals shown in FIG. **4**.

FIG. **6** is a partial perspective view of an alternative portable spill containment system.

FIG. **7** is an exploded partial perspective view of an alternative portable spill containment system.

FIG. **8** is a partial perspective view of a post bracket.

FIG. **9** is a sectional view of FIG. **8**.

FIG. **10** is a plan view of FIG. **8**.

FIG. **11** is a partial sectional view of an alternative post bracket.

FIG. **12** is a plan view of FIG. **11**.

FIG. **13** is an exploded partial perspective view of an alternative portable containment system.

FIG. **14** is a partial sectional view of FIG. **13**.

FIG. **15** is an exploded partial perspective view of FIG. **13**.

FIG. **16** is a partial sectional view of FIG. **13**.

FIG. **17** is a perspective view of an alternative portable containment system.

FIG. **18** is a perspective view of an alternative portable containment system.

FIG. **19** is a perspective view of an alternative portable spill containment system.

It should be understood that the descriptions and drawings herein are merely illustrative and that various modifications and changes can be made in the structures disclosed without departing from the present disclosure. In general, the figures are not to scale. It will be appreciated that the various identified components of the exemplary portable spill containment system disclosed herein are merely terms of art that may vary from one manufacturer to another and should not be deemed to limit the present disclosure.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to the drawings, wherein like numerals refer to like parts throughout the several views, FIG. **1** illustrates a portable containment system **30**. The portable containment system **30** includes a flexible bag **32**, a plurality of pedestals **34**, and at least one grate **36**. As illustrated, the grate **36** supports a container **38**. Further, a railing **42** can be attached to the pedestals **34**.

With reference to FIGS. **1-3** and **7**, the flexible bag **32** is formed of a flexible fabric or sheet that defines an integral fluid-tight or leak-proof structure. Initially, it is noted that the term 'leakage' could include solids or liquids. The flexible bag **32** includes a bag interior **44** that is defined by the bag sidewall **46**. The bag sidewall **46** includes a bag sidewall interior surface **48** and a bag sidewall exterior surface **52**, which is opposite the interior surface **48**. The flexible bag **32** contains any leakage that may occur from the container **38** that has passed through the grate **36**.

As illustrated, the flexible bag **32** also includes a bag bottom **54** that is opposite the grate **36**. For reference, the bag sidewall **46** defines an opening that receives the grate **36**. The bag bottom **54** includes a bag bottom interior surface **56** and bag bottom exterior surface **58**, with the bag bottom exterior surface **58** being opposite the bag bottom interior surface **56**. As illustrated, the bag **32** receives the plurality of pedestals **34** and contains leakage from the container **38**. The interior surfaces **48**, **56** of the flexible bag **32** face the plurality of pedestals **34**.

With the continued reference to FIGS. **1-3**, the grate **36**, which could also be referred to as a support deck, includes an upper grate surface **62** and a lower grate surface **64** and is of a generally rectangular shape. The grate **36** can be made from injection-molded or rotationally molded plastic or structured foam. The lower grate surface **64** is opposite the upper grate surface **62**. The grate **36** also includes a side grate surface **66** that faces the bag sidewall **46**. The grate **36** also defines a plurality of drain holes **68** that allow leakage from the container **38** to pass therethrough for collection in the bag **32**. Further, the grate **36** serves to support the container **38**. While illustrated as being a plurality of grates, it will be appreciated that the grate **36** could be a single grate or a plurality of grates.

With particular attention to FIGS. **2-3** and **7**, the pedestal **34** is shown. The pedestal **34** includes a pedestal top wall **72** that has a generally planar face that faces toward the grate **36**. The planar face allows for a stable interface between the pedestals **34** and the grate **36**. The pedestals **34** are hollow, which allows them to be stacked on atop the other in nested fashion, much like disposable drinking cups (open end down). This allows for the pedestals **34** to be shipped and stored in a compact condition. The pedestal wall **74** can define a plurality of grooves **76** that extend in a generally vertical direction. The grooves **76** increase the strength of the pedestals **34** and also allow air to enter between the pedestals **34** when they are being separated from each other (i.e., un-nested), making separation easier

As shown in FIGS. **2-3**, the pedestals **34** are single-piece, unitary construction, which can be made from injection-molded or rotationally molded plastic or structured foam. The pedestals **34** may reduce in cross-sectional size as they extend from the bag bottom **54** toward the grate **36** so as to have a tapered shape. This tapered shape allows a wide base to increase stability with a smaller top to reduce the number of drain holes **68** that are obstructed by the pedestal **34**. It will be appreciated that additional pedestals could be used to support the grate **36** at positions other than the perimeter (i.e., under the center of the grate). The pedestals **34** illustrated in FIGS. **1-3** and **7** are single-piece, unitary pedestals.

The pedestals **34** include a plurality of primary projections **78** that extend from the planer face of the top wall **72** toward the grate **36** so as to be received alongside the grate **36**. As illustrated, the primary projections **78** have a circular cross-section. However, it will be appreciated that other shapes are contemplated. The pedestals **34** can also include a plurality of secondary projections **82** that extend from the planer face of the top wall **72** toward the grate **36**. Although the secondary projections **82** are shown as having a circular cross-section, it will be appreciated that other shapes are possible. Specifically, any shape that allows the secondary projections **82** to be received in the drain hole **68** of the grate **36** is possible. As illustrated, the primary projections **78** are disposed around a perimeter of the top wall **72** so as to at least partially surround the secondary projections **82**. This arrangement helps to keep the grate **36** secured to the pedestal **34**.

Further, the secondary projections **82** define a secondary projection length as they extend from the top wall **72** toward the grate **36** just as the primary projections **78** define a primary projection length as they extend from the top wall **72** toward the grate **36**. As illustrated, the primary projection length is greater than the secondary projection length. This difference in projection length between the primary projections **78** and the secondary projections **82** allows for the grate **36** to be indexed to the pedestal **34** with the primary projections **78** while still providing positive engagement between the grate **34** and the secondary projections **82**.

It will be appreciated that the primary and secondary projections **78**, **82** described hereinabove could be part of the grate **36** instead of the pedestals **34**. Specifically, alternate projections could downwardly extend from the grate **36** toward the pedestals **34** so as to provide similar engagement between the grate **36** and the pedestals **36** as previously described. It will also be appreciated that if alternate projections extending from the grate were utilized, that the pedestals could include at least one bore or indentation provided in the top wall to receive the respective projections. Further, it will be understood that a combination of projections extending from the grate and projections extending

from the pedestal could simultaneously be employed without departing from the scope of the invention.

With reference to FIGS. **1-2**, a plurality of posts **84** are shown. The posts **84** each include a first end **86** and a second end **88**, with the second end **88** being opposite the first end **86**. The plurality of posts **84** are joined to one another by a connecting rail **92** that attaches near the first end **86** of each of the posts **84**. Further, the posts **84** can be attached to the pedestals **34** at the second end **88** of the respective posts **84**. As such, the second end **88** of the respective post **84** can receive at least a portion of the primary projection **78** of the pedestal **34**. Therefore, the posts **84** can be mounted to the pedestal **34** without the use of additional hardware, thereby minimizing cost and simplifying assembly of the system.

With reference to FIGS. **4-5**, an alternative containment system **90** with a a composite pedestal **94** is shown. The composite pedestal **94** can be made of the same materials as the pedestal **34**. Further, the composite pedestal **94** can also be hollow. The composite pedestal **94** can include an upper pedestal member **96** with a sidewall **98** and a top wall **102**. The composite pedestal **94** can also include a lower pedestal member **104** with a sidewall **106** and a top wall **108**.

The lower pedestal member **104** can include a raised rim **112**. This raised rim **112** can be used to prevent lateral disengagement between the upper pedestal member **96** and the lower pedestal member **104**. The lower pedestal member **104** can also include a base ring **114**. This base ring increases a general footprint of the pedestal **94** to increase stability while being received with the bag **32**.

As illustrated, the lower pedestal member **104** can also include a bead **116** and the upper pedestal member **96** can include a column **118**. The bead **116** and the column **118** cooperate to assist when the respective pedestal members **96**, **104** are respectively nested, similar in function to the groove **76**. As shown, a block **122** may be used as an interface between the grate **36** and the composite pedestal **94**. The block **122** may optionally be used to adjust an overall height of the grate **36**. As shown in FIG. **5**, the composite pedestal **94** includes primary projections **78** and secondary projections **82** as like the pedestal **34**.

The composite pedestal **94** allows for customization. Specifically, depending upon the particular needs, the end user could use only upper pedestal member **96** or the lower pedestal member **104** to support the grate **36**. Alternatively, the end user could use both the upper pedestal member **96** and the lower pedestal member **104** to form taller pedestal structures. Thus, for small volume containment needs or in instances when the grate **36** is going to be used to store a drum or container in a workstation configuration, a shorter single pedestal member could be used. However, in instances when a pallet of drums was going to be stored and the volume of potentially leakable materials is greater, taller multi-component pedestals could be used.

As illustrated in FIG. **5**, the bag **32** can include a pocket **124** that receives the primary projection **78** so as to attach the bag **32** to the pedestal **34**, **94**. Specifically, at least one of the primary projections **78** can at least be partially inserted through the pocket **124**. The pocket **124** may be made of the same or similar materials as the bag **32**. Alternatively, the pocket **124** may be made of other materials that provide sufficient strength to connect the bag **32** to the pedestal **34**. Further, the pocket **124** may be integral to the bag **32** or a separate component.

With reference to FIG. **6**, an alternate containment system **120** is shown. The bag **32** can include a sidewall flap **126**. The sidewall flap **126** at least partially extends onto the upper grate surface **62** of the grate **36**. The sidewall flap **126** may be of the same material and construction as the bag sidewall **46**. The sidewall flap **126** may be affixed to the grate **36** with adhesive tape **128**. This tape **128** may be used solely to attach the bag **32** to the pedestal **34**, **94** or in addition to other attachment methods.

With reference to FIG. **7**, an alternate containment system **129** is shown. The alternate containment system **129** utilizes the bag **32** and pedestal **34** to contain any leakage that has passed through the drain holes **68** of the grate **36**. However, the alternate containment system **129** also includes a mounting member **130**. The mounting member **130** is disposed between the pedestal **34** and the grate **36** to ensure that the bag sidewall **46** of the bag **32** remains sufficiently vertical so as provide an adequate volume for capturing the leakage. As illustrated, the mounting member **130** includes mounting holes **131** that receive the primary projections **78**. The mounting member **130** may be integral to the bag **32** or may be a separate component that is connected to the bag **32**. As such, the mounting member **130** may be made of any material that provides sufficient strength to retain the bag sidewall **46** in a generally upright position. Because the mounting member **130** is disposed between the pedestal **34** and the grate **36**, the mounting member **130** is exposed to downward force due to the weight of the container **38** (i.e., a compressive force between the pedestal **34** and the grate **36**). As such, the connection strength between the bag **32** and the pedestal **34** improves as the weight of the container **38** on the grate **36** is increased.

With reference to FIGS. **8-12**, post brackets are shown. The post brackets can be used to mount the post **84** to the grate **36**. The post brackets can be used in addition to or in place of mounting the post **84** to the primary projections **78**. Further, the post brackets can be made of any number of materials that provide sufficient strength and rigidity to support the post **84** as will be described in more detail hereinafter.

With reference to FIGS. **8-10**, a clamp **132** is used as a post bracket. The clamp **132** includes an upper wall **134**, a lower wall **136**, and a connecting wall **138**. The upper wall **134** defines a posthole **142**. The grate **36** is disposed between the upper wall **134** and the lower wall **136**. Because of the shape of the clamp **132**, the clamp **132** can be securely connected to the grate **36**, while still permitting removal of the clamp **132** from the grate **36** when desired.

In particular, the posthole **142** receives the post **84** to allow for easy attachment of the post **84** to the grate **36**. Specifically, the first end **86** of the post **84** is vertically spaced from the grate **36** a distance that is greater than a vertical distance between the second end **88** of the post **84** and the grate **36**. The bracket can further include a retention member **144** that extends from the upper wall **134** toward the lower wall **136** so as to be received at least one of the drain holes **68**. The retention member **144** can have a square cross-sectional shape. This shape complements the shape of the drain hole **68** for sufficient engagement. The connecting wall **138** joins the upper wall **134** and the lower wall **136** so that the post **84** is disposed between the connecting wall **138** and the grate **36**, thereby ensuring a sturdy connection.

With reference to FIGS. **11-12**, an alternate bracket is shown as a clip **146**. The clip **146** can include an upper wall **148** and a lower wall **152**. A partition wall **154** joins the upper wall **148** and the lower wall **152** together so that the partition wall **154** is disposed between the post **84** and the grate **36**. The upper wall **148** can also include a post aperture **156** for receipt of the post **84**. Further still, a post boss **158** can extend from the lower wall **152** toward the upper wall **148** so as to be in registry with the post aperture **156** for

engagement with the second end of the post **84**. The post boss **158** provides additional stability to the connection between the post **84** and the clip **146**. The clip **146** can also include a retention projection **162** with an X-shaped cross-section. The retention projection **162** extends from the upper wall **148** toward the lower wall **152** and is received in the drain holes **68** of the grate **36**. The X-shaped cross-section of the retention projection **162** helps to minimize weight and material cost for the clip **146** while still providing sufficient engagement between the clip **146** and the grate **36**.

With reference to FIGS. **13-16**, an alternate containment system **164** is shown. The containment system **164** can include a first beam **166** and a second beam **168**. The beams **166**, **168** can have a generally rectangular shape and be made of any number of materials. It is envisioned that the beams **166**, **168** be constructed of materials that are chemically inert and lightweight. However, other materials are possible and contemplated. The first beams **166** are spaced from and oriented parallel to one another. Further, the first beams **166** each include a first beam top surface **172** that faces the grate **36** and a first beam bottom surface **174** that is opposite the first beam top surface **172**.

The second beams **168** are spaced from one another. As illustrated, the second beams **168** are oriented perpendicular to the plurality of first beams **166**. However, it will be understood that the second beams **168** could be oriented to the plurality of first beams **168** in alternative layouts. The second beams **168** can each include a second beam top surface **176** that faces the grate **36** and a second beam bottom surface **178** that is opposite the second beam top surface **176**. The first beams **166** and the second beams **168** are disposed within the flexible bag **32** so that at least one of the first beam top surfaces **172** and the second beam top surfaces **176** contacts the grate **36** and at least one of the first beam bottom surfaces **174** and the second beam bottom surfaces **178** contacts the interior surface of the bag bottom **54** of the bag **32**. The first beams **166** and the second beams **168** can include beam fingers **182**, **184**, respectively. It will be appreciated that the first and second beams **166**, **168** could be spaced from one another greater than is illustrated so as to create a large void in a center of the assembly so as to create a picture frame type support. As the number of beams **166**, **168** is reduced, the storage capacity of the bag **32** is increased.

As shown in FIG. **14**, the flexible bag **34** may include a plurality of yokes **186** that extend toward the interior of the flexible bag **32**. The yokes **186** may be made of the same or similar material as the bag **32**. Alternatively, the yokes **186** may be made of any other material while provides sufficient strength to hold the bag **32** to the beams **166**, **168** when the bag **32** is full of leaked material. The fingers **182**, **184** can removably engage the yokes **186** of the bag **32** to attach the bag **32** to the beams **166**, **168**.

With reference to FIG. **15**, the first beam **166** and the second beam **168** are shown in an exploded view. The first beam **166** can include a joining channel **188** and the second beam **168** can include a joining channel **192**. The joining channels **188**, **192** cooperate with one another to allow assembly of the first beams **166** and second beams **168** together in a structurally rigid configuration as illustrated.

With reference to FIG. **16**, the first beam **166** is shown. As illustrated, the first beam **166** can include a tab **194** and slot **196**. The tab **194** and the slot **196** complement one another to allow shorter lengths of the first beam **166** to be combined to increase the overall length. It will be appreciated that a similar type of tab/slot layout could be used with the second beam **168**.

With reference to FIG. **17**, an alternative spill containment system **198** with an enclosure is shown. This system **198** includes a canopy **200**. The canopy includes a frame **202** that supports a covering **204**. The frame **202** includes a plurality of upright members **206**, linear connection members **208**, and curved connection members **210**. These members **206**, **208**, **210** are held together with a variety of connectors **212**. The frame **202** cooperates with the covering **204** to define a shell wall **216** and a shell top **218**. Further, a shell door **222** is affixed to the shell wall **216** with a zipper **224** to allow access within the canopy **200**. Further, a document window **226** can be used to retain various documents associated with the materials located within the container **38**. Further still, a tie down **228** may be used to affix the shell wall **216** to the flexible bag **32**. Finally, a mounting strap **232** can be used in conjunction with a stake **234** to affix the containment system **198** to the ground or otherwise.

With reference to FIG. **18**, an alternate containment system **236** with an enclosure is shown. This system **236** includes a rigid structure **238** with panels **240** and a roof **242**. Further, a tambour door **244** is attached to the panels **240** with a rail arrangement to allow access to the container **38** disposed within. Although not illustrated, it will be understood that the system **236** could also include a document window **226** for holding documents.

As is considered apparent, the enclosures of FIGS. **17-18** allow the container **38** to be located between the grate **36** and the enclosure (i.e., canopy **200**, rigid structure **238**). The enclosure allows the containment assembly to be used in outdoor applications. Further, rain and other precipitation does not enter into the flexible bag **32**, but rather passes off the enclosure and onto the ground. However, materials that have leaked from the drums or contains stored on the grate **36** would be collected in the flexible bag **32**. This ensures that the bag **32** does not become prematurely filled with material that does not need to be contained.

With reference to FIG. **19**, an alternate portable containment system **246** is shown. The system **246** can include a carrying handle **248** that is attached to the exterior surface **52** of the bag **32** at a plurality of locations so as to define a loop. The loop is adapted to be of sufficient size to allow for receipt of a human hand to aid in carrying the system **246**. Additionally, a plurality of packing straps **252** may encircle the flexible bag **32**. These packing straps **252** can be disposed so as to be spaced from and on opposite sides of the carrying handle **248**. The straps **252** ensure that all of the components remain within the bag **32** until deployment of the system **246** is needed.

Thus, the portable containment system **246** can be shipped or stored in a compact arrangement, not unlike a suitcase, which can be transported to an assembly location and assembled to form the containment system as illustrated in the other embodiments of the present application. Notably, the pedestals **34** and/or composite pedestals **94** could be disposed within the bag **32** during shipment or storage or could be separately located. Further still, the grate(s) **36** could be received within the bag **32** illustrated in FIG. **19** during shipment or storage. Thus, the bag **32** serves to contain the various components during shipment/storage and also capture leakage from the container placed on the grate during usage.

Additionally, advantages and modifications will readily occur to those skilled in the art. Therefore, the invention in its broader aspects is not limited to the specific details and illustrative examples shown and described herein. Accordingly, various modifications may be made without departing

from the scope or spirit of the general inventive concept as defined by the appended claims and their equivalence.

What is claimed is:

1. A method for protecting a ground surface from exposure to material that may be spilled from or leak from one or more containers, the method comprising:

arranging, on the ground surface, a flexible bag having a bag bottom and a bag sidewall that cooperate to define an interior;

interconnecting a plurality of separate and distinct first beams and a plurality of separate and distinct second beams together to form an interconnected grid structure disposed in the interior of the flexible bag;

placing at least one perforated grate on the interconnected grid structure disposed in the interior of the flexible bag such that the at least one perforated grate is supported above the bag bottom by the interconnected grid structure; and

placing the one or more containers of material onto the at least one perforated grate supported above the bag bottom by the interconnected grid structure disposed in the interior of the flexible bag.

2. The method according to claim **1**, wherein the flexible bag is in a folded condition before the flexible bag is arranged on the ground surface, and wherein the method further comprises unfolding the flexible bag.

3. The method according to claim **2**, wherein the method further comprises shipping the flexible bag in the folded condition together with the plurality of separate and distinct first beams, the plurality of separate and distinct second beams and the at least one perforated grate.

4. The method according to claim **3**, wherein the plurality of separate and distinct first beams, the plurality of separate and distinct second beams and the at least one perforated grate are wrapped inside the flexible bag when the flexible bag is shipped in the folded condition.

5. A method for protecting a ground surface from exposure to material that may be spilled from or leak from one or more containers, the method comprising:

arranging, on the ground surface, a flexible bag having a bag bottom and a bag sidewall that cooperate to define an interior;

disposing a plurality of pedestals within the interior of the bag, each of said plurality of pedestals including a top wall with a primarily planar face, and at least one primary projection and at least one secondary projection, both of which project upwardly from the primarily planar face;

placing at least one perforated grate on the plurality of pedestals disposed within the interior of the bag such that the at least one perforated grate rests in contact with the primarily planar face of the plurality of pedestals between the at least one primary projection and the at least one secondary projection and the at least one perforated grate is supported above the bag bottom by the plurality of pedestals; and

placing the one or more containers of material onto the at least one perforated grate supported above the bag bottom by the plurality of pedestals disposed in the interior of the flexible bag.

6. The method according to claim **5**, wherein the flexible bag is in a folded condition before the flexible bag is arranged on the ground surface, and wherein the method further comprises unfolding the flexible bag.

7. The method according to claim **6**, wherein the method further comprises shipping the flexible bag in the folded condition together with the plurality of pedestals and the at least one perforated grate.

8. The method according to claim **7**, wherein the plurality of pedestals and the at least one perforated grate are wrapped inside the flexible bag when the flexible bag is shipped in the folded condition.

9. The method according to claim **7**, wherein the plurality of pedestals have a hollow interior and are nested together in a stack when shipped.

10. The method according to claim **5**, wherein the flexible bag includes a plurality of pockets, and wherein the method further comprises inserting the primary projections of the plurality of pedestals disposed within the interior of the bag into respective pockets such that the primary projections function as hooks that hold up the bag sidewall.

* * * * *